II. REMARKS

Preliminary Remarks

This response is timely filed, as it is being filed with a petition for a one-month extension of time. After entry of this amendment, claims 1-23 will be pending in this patent application. The applicants have amended claims 1, 9, and 16 for readability, have introduced new claim 23, and have made minor editorial amendments to the specification, in particular to remove hyperlinks and to treat certain proprietary terms more consistently. Support for new claim 23 is found particularly in the paragraph spanning pages 16 and 17 of the specification, and also throughout the specification. No new matter is believed to have been introduced by any of these amendments.

Request for Return of Initialed IDS

The applicants have not yet received an initialed copy of the IDS filed by mail on May 2, 2002. An initialed copy of that IDS is respectfully requested along with the next official action.

Patentability Remarks

35 U.S.C. § 101

Claims 1-22 were rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. The examiner's position is that claims 1-22 are directed to non-statutory subject matter because they allegedly "do not require the performance of any physical result or transformation outside of the computer." In making the rejection, the examiner points out the guidelines in MPEP § 2106. The applicants respectfully disagree with the examiner's position.

35 U.S.C. § 101 requires that any process or system for which a patent is sought must be "useful," and the guidelines in MPEP § 2106 exist, in part, to ensure that processes and systems involving computation have some usefulness, *i.e.*, that those processes and systems do not involve merely abstract data that is manipulated in an abstract calculation to arrive at a result with no practical meaning. However, the applicants submit that a claimed process or system is not non-statutory merely because it does not produce a "physical result or transformation outside of the computer" in the sense that the examiner contemplates and, furthermore, submit that the guidelines in MPEP § 2106 recognize this.

In fact, MPEP § 2106 defines several specific "safe harbors," *i.e.*, cases in which claims are patentable without directly producing a tangible result outside of the computer. One of those "safe harbors," set forth in MPEP § 2106(IV)(B)(2)(b)(i) on page 2100-16, involves "manipulation of data representing physical objects or activities (pre-computer process activity)." As the MPEP explains, processes or systems that require measurements of physical objects or activities to be transformed outside of the computer into computer data are statutory.

The applicants submit that this is the case with the present claims. Each of independent claims 1, 9, and 16 recites that the process or system involves receiving "sets of expression data derived from control and treatment sets of cell-derived samples as crisp input data." The expression data reflects "a direction and magnitude of regulation of each one of a higher number of different genes or proteins." Therefore, each of the independent claims clearly recites a process or system that operates on real-world values, and each of the independent claims clearly requires that those real-world values be transformed into sets of expression data that may be operated on during the claimed processes. (In fact, one process for transforming isolated RNA from cells into sets of data usable in a process according to the claims is described on page 11 of the present specification.) Thus, the applicants respectfully submit that the claims are statutory under 35 U.S.C. § 101, as set forth in MPEP § 2106.

Moreover, to step back from the specific guidelines in MPEP § 2106, the applicants submit that the processes and systems recited in the present claims are clearly useful and, thus, clearly satisfy the requirements of 35 U.S.C. § 101. As the examiner no doubt appreciates, expression profiling, the process of determining the magnitude and direction of regulation of genes or proteins in a biological cell, can generate voluminous data sets that are not amenable to ordinary methods of analysis, and determining relationships between the various genes or proteins reflected in those data sets can be important, for example, in the process of drug discovery. Methods and systems according to the present claims allow those relationships to be determined efficiently. All of this is explained in the background section and other portions of the specification. For at least these reasons, as well as the more "technical" reasons given above, the applicants respectfully submit that the claims comply with the requirement of 35 U.S.C. § 101 for "useful" processes and systems.

Accordingly, the applicants respectfully request that the rejection be withdrawn. Additionally, the applicants note that new claim 23 is statutory under 35 U.S.C. § 101 for at

least the same reasons as set forth above and, accordingly, request that the rejection not be extended to cover the new claim.

35 U.S.C. § 112

Claims 1-15 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. The examiner's position is that the claims are indefinite because the preambles of claims 1 and 9 recite that the processes and systems recited in those claims operate on information obtained from differential expression of genetic information, but "confusingly there is no 'differential' expression practice in the actual steps." The examiner notes that the same alleged "unclarity" is also present in claim 9, and queries whether the preamble or the actual claim steps control the metes and bounds of the claims. The applicants respectfully disagree with the examiner's position.

In response, the applicants submit that the claims recite what they recite, and that there is no inherent indefiniteness in any of those recitations. As the applicants explained above, independent claims 1 and 9 recite processes and systems, respectively, for operating on and finding relationships in sets of data derived from differential expression of genetic information in control and treated biological cells. They do not positively recite "differential expression practice" itself because that "practice," *per se*, is not the applicants' invention; rather, the applicants' invention is concerned with how to analyze data from that "practice." To that end, the applicants note that 35 U.S.C. § 112, second paragraph, specifically provides a patent applicant with the right to claim only that which "the applicant regards as his invention." The applicants respectfully submit that their exercise of that right is not and should not be grounds for imposing a 35 U.S.C. § 112, second paragraph, rejection.

Furthermore, after considering the examiner's position carefully, the applicants believe and respectfully submit that in making the rejection, the examiner identified a broader question of controlling law and/or fact, rather than any specific points of indefiniteness in the applicants' claims. In particular, it appears to the applicants that the examiner has established exactly and definitely what the claims recite, and is merely wondering whether certain terms in the preamble should be given weight. The applicants appreciate the difficulty of making that determination, but respectfully submit that the underlying question is not and should not be a proper basis for making a 35 U.S.C. § 112, second paragraph, rejection.

Notwithstanding the above, in order to provide an answer to the examiner's query, the applicants note the guidance in MPEP § 2111.02 that "the determination of whether a

preamble limits a claim is made on a case-by-case basis in light of the facts in each case; there is no litmus test defining when a preamble limits the scope of a claim." As explained in MPEP § 2111.02, the examiner should be able to answer the query posed in the official action by considering the entire record of this application. If any questions on this topic remain, the applicants believe that those questions might best be resolved by a personal interview. However, for at least the reasons given above, the applicants respectfully request that the rejection be withdrawn and not extended to new claim 23.

As an additional matter, and without conceding that any one of the claims is indefinite, the applicants have chosen to re-order certain phrases in claims 1, 9, and 16 in order to improve their readability. The applicants do not believe that these amendments constitute narrowing amendments.

35 U.S.C. § 102

Claims 1-3, 9-11, and 16-18 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Ramm *et al.*, U.S. Patent No. 6,345,115 (hereinafter the "'115 patent"). The '115 patent discloses an assay imaging system that uses a fuzzy logic-based algorithm to process an image and to register the locations of the various targets in the image with their expected positions. The examiner's position is that this image processing fuzzy logic algorithm anticipates the claims. The applicants respectfully disagree.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The applicants submit that the '115 patent does not disclose each and every element of the applicants' claimed invention. In particular, the applicants submit that whatever the '115 patent may disclose with respect to the fuzzy logic processing of images, it does not disclose "receiving sets of expression data derived from control and treatment sets of cell-derived samples as crisp input data, said sets of expression data representing a direction and a magnitude of regulation of each one of a higher number of different genes or proteins" as recited in claims 1, 9, and 16.

The information "received" by the apparatus of the '115 patent is nothing more than an image, which may be an image of fluorescing assay targets. That image is not a set of expression data representing the direction and magnitude of regulation of a higher number of different genes or proteins, as the terms are used in the present specification. The applicants

note that while the claim interpretation used by the examiner must give the claims their "broadest reasonable interpretation," that interpretation must be "consistent with the specification." See, for example, MPEP § 2111, citing *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667.

Furthermore, while gene expression analysis may be generally referenced in the '115 patent (separately from the disclosure of the fuzzy logic image registration algorithm), nowhere does the '115 patent disclose performing a fuzzy logic algorithm on the results of the gene expression analysis.

In fact, the applicants respectfully submit that the methods taught in the '115 patent actually fall within the "differential expression practice," that the examiner has admitted is not recited in the applicants' rejected claims. Accordingly, and apparently by the examiner's own admission, the applicants submit that the '115 patent does not anticipate independent claims 1, 9, and 16, or the claims that depend from them.

Moreover, the applicants disagree with the examiner's assertion that the statistical analysis disclosed in the '115 patent constitutes defuzzifying and confidence level determination as recited in the claims. In the first sentence of the paragraph dealing with statistical segmentation, at column 10, line 41, the '115 patent states that "luminance data from the aligned matrix are output to software" (emphasis added). Since the purpose of the fuzzy logic algorithm is to align the matrix, this sentence clearly indicates that the statistical segmentation algorithm operates only on the result from the fuzzy logic algorithm and forms no part of the fuzzy logic algorithm itself. Simply put, these are two different processes. Similarly, the calibration process to which the examiner refers is clearly described as being a separate process from the fuzzy logic algorithm.

For at least the above reasons, the applicants respectfully request that the rejection be withdrawn and not extended to new claim 23, which recites a "method of determining relationships between elements of differential gene expression data, the data being from both control sets of biological cells and treated sets of biological cells and reflecting a direction and magnitude of regulation of a number of different genes or proteins."

III. CONCLUSION

In view of the foregoing, the applicants submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the examiner is strongly urged to contact the undersigned at the telephone number set forth below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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